

**EXPLANATION OF SIGNIFICANT DIFFERENCES  
TO THE HARBOR ISLAND –  
SHIPYARD SEDIMENT OPERABLE UNIT  
LOCKHEED SHIPYARD SEDIMENTS  
SEATTLE, WASHINGTON**

**SELECTED REMEDIAL ACTION**

**I. Introduction**

**A. Purpose**

The purpose of this Explanation of Significant Differences (ESD) is: (1) to establish confirmational numbers characteristic of contamination present in the West Waterway for the purpose of defining contamination associated with Lockheed Shipyard as the source; (2) to summarize the long-term monitoring, maintenance and operational parameters for Lockheed Shipyard Sediment Operable Unit (LSSOU), and (3) to identify the disposal option.

**B. Site Name and Location**

The LSSOU consists of contaminated nearshore sediments within and adjacent to the Lockheed Shipyard on Harbor Island (Figure 1). Harbor Island is located approximately one mile southwest of the Central Business District of Seattle, in King County, Washington, and lies at the mouth of the Duwamish Waterway on the southern edge of Elliott Bay (Figure 2). The island is manmade, approximately 430 acres in size, and used for industrial purposes. Lockheed Shipyard is located on the west side of Harbor Island and faces the West Waterway of the Duwamish Waterway.

**C. Lead and Support Agencies**

U.S. Environmental Protection Agency (EPA) – Lead Agency for sediment remediation.

State of Washington, Department of Ecology – Support Agency for sediment remediation.

#### **D. Statutory Authorities for the Explanation of Significant Differences (ESD)**

Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9617(c), and Section 300.435(c)(2) of the National Oil and Hazardous Substances Contingency Plan (NCP), authorize changes to the selected remedial action after issuance of a ROD. This ESD documents refinements to the selected remedial action for the Lockheed Shipyard Sediment Operable Unit.

#### **E. Administrative Record**

This ESD, the Record of Decision, the Conceptual Design Report, various technical memoranda presenting geotechnical characterizations and a marine structures survey, as well as sediment chemical and biological testing results, and other reports and information related to the LSSOU are part of the administrative record. The administrative record is available for public review at the following location:

Environmental Protection Agency  
1200 Sixth Avenue, 7<sup>th</sup> floor  
Seattle, Washington  
(206) 553-4494

## **II. Summary of Site History, Nature and Extent of Contamination and Selected Remedy**

Harbor Island and the surrounding estuarine environment are highly industrialized. Prior to 1905, the area consisted of tideflats with a few piling-supported structures (mainly railroad trestles). The island was created between 1903 and 1905 with dredged material from straightening of the Duwamish River into the Duwamish Waterway. Since construction, the island has been used for commercial and industrial activities.

Lockheed Shipyards acquired established shipbuilding operations in 1959 and the facility until 1986. In April 1997, Lockheed sold the upland property and its legal rights to the submerged portions of the site to the Port of Seattle. Existing structures on the site include 3 piers, three shipways and one finger pier. The piers and shipways primarily consist of timber superstructures supported by approximately 6000 piles. Portions of the shipways are comprised of partially submerged wooden decks supported on closely spaced pilings.

Harbor Island was listed by EPA as a Superfund site in 1983. EPA issued the SSOU ROD in November 1996, for the remediation of contaminated sediments adjacent to both the Todd and the former Lockheed Shipyards. EPA determined that cleanup

actions were necessary because of unacceptable risks to benthic organisms and to subsistence fishers.

The ROD states: (1) all sediment exceeding the chemical contaminant screening level (CSL) of the State of Washington Sediment Management Standards (SMS) and shipyard waste be dredged and disposed of in an appropriate in-water or upland disposal facility, (2) all sediments exceeding the sediment quality standards (SQS) of the SMS be capped with a minimum of 2 feet of clean sediment, (3) specification of design criteria for acceptable habitat and to prevent future recontamination; and (4) institution of long-term monitoring and maintenance of the remedy. Additionally, the ROD notes that “(t)he extent of dredging of contaminated sediments and waste under piers at ... Lockheed Shipyard will be determined during remedial design based on cost, benefit and technical feasibility.”

The LSSOU was established because LSSOU “sediments are distinct from other contaminated sediments at Harbor Island ... they are predominately contaminated with hazardous substances and shipyard wastes (primarily sandblast grit) released by shipbuilding and maintenance operations at Lockheed (and Todd) Shipyards” (see ROD, Section E. Scope and Role of Response Action Within the Remedial Strategy). Hazardous substances released from these shipyards include arsenic, copper, lead, mercury, tributyltin (TBT), and zinc, which were additives to marine paints used on ships. Other hazardous substances potentially associated with shipyard activities include polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs).

### **III. Description of and Basis for the Significant Differences**

#### **A. Introduction**

Subsequent to the ROD, pre-remedial design studies for the Lockheed Shipyard Sediment Operable Unit have better defined the nature and extent of contamination within the LSSOU. The 2002 Lockheed ESD summarized the sediment characterization data, specified details regarding the dredge and cap remedy, and defined abrasive grit blast. For this ESD, this sediment characterization data has been further used by EPA to develop criteria for identifying contamination associated with the LSSOU as a source.

This ESD documents the following for the Lockheed Shipyard Sediment Operable Unit:

- (1) establishes confirmational numbers that will be used to distinguish contaminants characteristic of West Waterway from contamination associated with the LSSOU;
- (2) summarizes the long-term monitoring, maintenance and operational parameters for LSSOU; and
- (3) identifies the disposal option for contaminated sediments dredged from the LSSOU.

## B. Confirmational Numbers

Confirmational numbers have been defined as those concentrations that EPA has determined to be characteristic of contamination present in the adjacent West Waterway. These confirmational numbers have been used to assist EPA in defining the extent of LSSOU remediation; and could also be used in determining potential future recontamination. However, EPA's determination of the extent of LSSOU contamination and remediation is not intended to release Lockheed from whatever liability it may have in the adjacent West Waterway Operable Unit.

Following dredging of the LSSOU, samples will be taken from the post-dredge surface at selected locations along the LSSOU boundary. Sediments on the boundary and inside the LSSOU must meet the SQS cleanup numbers. If any newly exposed surfaces outside the LSSOU result due to remedial action at the LSSOU, then any COC that may be present on the newly exposed surfaces must be below confirmational numbers (see below).

Confirmational Numbers by Chemical of Concern			
Contaminant	SQS (mg/kg)	CSL (mg/kg)	Confirmational Number
Arsenic	57 dw	93 dw	93 (mg/kg) dw
Copper	390 dw	390 dw	390 (mg/kg) dw
Lead	450 dw	530 dw	530 (mg/kg) dw
Zinc	410 dw	960 dw	960 (mg/kg) dw
LPAHs*	370 toc	780 toc	780 (mg/kg) toc 13 mg/kg dw
HPAHs**	960 toc	5300 toc	5300 (mg/kg) toc 69 mg/kg dw
For Bioaccumulants			
PCBs	12 toc	65 toc	39 (mg/kg) toc 591 ug/kg dw
Tributyltin	not available	not available	76 (mg/kg) toc 1335 ug/kg dw
Mercury	0.41 dw	0.59 dw	1.34 (mg/kg) dw

dw = dry weight  
toc = total organic carbon normalized

\* low molecular weight polynuclear aromatic hydrocarbons  
\*\* high molecular weight polynuclear aromatic hydrocarbons

Given the coarse-grained characteristics of some of the LSSOU sediments, EPA will retain use of the dry weight (dw) TBT confirmational number as well as the total organic carbon (TOC) normalized value. Where the TOC is less than 1 percent, the dry weight criterion will be used; otherwise the TOC-normalized version will apply.

### **C. Long-term Operational, Maintenance, and Monitoring Parameters**

A Long-Term Operational, Maintenance and Monitoring Plan (OMMP) is designed to detect any future contamination of the LSSOU as well as the failure to adequately confine the existing underlying contaminated sediments. The OMMP will be submitted with the 95% Remedial Design for the LSSOU. The following will be addressed in detail in the OMMP:

- monitoring of dredged sediments for recontamination with chemicals of concern (COCs) at specified intervals, or based on previous monitoring results and following disruptive events such as significant storm, dredging, earthquake events.
- monitoring for cap integrity to determine compliance with performance requirement, including cap thickness and uniformity via bathymetric surveys, and deposition of sediment or organic materials at specified intervals or based on previous monitoring results and following disruptive events such as significant storm, dredging, earthquake events.
- monitoring to determine compliance with source control performance standards.

All monitoring activities will be subject to EPA's review, approval, oversight and reporting requirements.

### **D. Disposal of Dredged Sediments**

The ROD stated that dredged sediments must be disposed in "appropriate confined nearshore disposal (CND) or confined aquatic disposal (CAD) facilities." The ROD further stated that the appropriate CND or CAD facilities would be selected in remedial design and if a suitable site could not be found, dredged sediments must be taken to an appropriate upland disposal facility. Analysis of disposal options during remedial design, based on the ROD criteria, identified upland disposal facilities as the appropriate disposal option for dredged LSSOU sediments.

## **IV. Support Agency Comments**

The Washington Department of Ecology participated in the review of the new information that led to the preparation of this ESD, and concurs with this

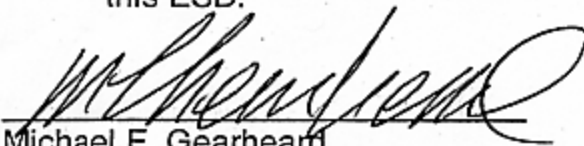
modification to the remedy for the Lockheed Shipyard Sediment Operable Unit. Ecology recognizes that EPA will conduct five year reviews for the Harbor Island Site. The primary purpose of a five year review is to determine whether the selected remedy continues to be protective of human health and the environment. The five year reviews will include the Soil and Groundwater Operable Unit, the two Shipyard Operable Units and the West Waterway Operable Unit. Ecology will have an opportunity to participate in the five year review. Among the issues that will be evaluated for the Shipyard Operable Units will be the contaminants remaining above the State Sediment Management Standards.

#### **V. Affirmation of Statutory Determinations**

Considering the new information that has been developed and the changes that have been made to the selected remedy, EPA believes that the remedy remains protective of human health and the environment, complies with federal and state requirements that were identified in the ROD as applicable or relevant and appropriate to this remedial action, and is cost-effective. The remedy continues to utilize permanent solutions and alternative treatment technologies to the maximum extent possible. This ESD is consistent with the requirements and considerations for remediation established in the ROD.

#### **VI. Public Participation Activities**

A public notice will be placed in a local newspaper announcing the availability of the ESD to the public. The Administrative Record, located at the information repository listed in section E of this ESD, contains the ESD and supporting documentation. A listing of the Administrative Record documents is attached to this ESD.

  
Michael F. Gearheard

Director, Office of Environmental Cleanup

3/31/05  
Date

To Be Added:

A listing of the Administrative Record documents